



A Guide to Home-heating Oil Tanks

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A Guide to Home-Heating Oil Tanks

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Hot Line Numbers

24-Hour Yukon Spill Line: 867-667-7244 (collect calls accepted)

24-Hour B.C. Spill Line: 1-800-663-3456

You Have a Legal Obligation to Report Spills!

All home-heating oil tank spills must be reported so that appropriate action can be taken to confine the spill and restore the site. Call the Spill Hotline as soon as you notice an oil spill from a home-heating oil tank.

If the person responsible for the spill does not attempt to confine the spill or to restore the site, an Environmental Protection Officer has the authority to order the responsible person to take action.

Home-heating Oil Tank Permits

You need a permit for the removal of an existing home-heating oil tank and the installation of a new home-heating oil tank.

In Whitehorse

City of Whitehorse – Planning & Development Services

4210 4th Ave., Whitehorse

867-668-8340

Fee: \$55

(the fee doubles to \$110 if the initial application for the permit occurs after the work is completed)

Outside Whitehorse

Government of Yukon – Building Safety Branch

2071 2nd Ave. (main administration building)

867-667-5741

Fee: \$25 minimum fee

(the actual permit fee is dependent on the cost of the installation)

For written verification for decommissioning an underground tank

Government of Yukon - Fire Marshal's Office

91790 Alaska Highway

Whitehorse, YT Y1A 5X7

867-667-5230

Fee: \$25 minimum fee

(the actual fee is dependent on the volume of the home-heating oil tank)

Acknowledgements

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This guide was produced by the Yukon Housing Corporation in collaboration with Aboriginal Affairs and Northern Development Canada, the Yukon Government's *Office of Building and Safety Standards*, the Yukon Government's *Department of Environment*, and the Yukon Fire Marshal's Office. The guide was also reviewed by an independent industry professional.

This guide was produced in response to public inquiries and to an increase in home-heating oil tank leaks reported to Yukon Housing Corporation and the territorial and federal government *Departments of Environment*.

An Important Note About This Guide:

First Nation offices, homeowners and residents should consult with a certified oil burner mechanic¹ to answer questions and address problems involving their home-heating oil tank and furnace system.

This guide is intended to provide general information only. It is not a complete manual on the proper installation and maintenance of home-heating oil tanks, accessories or heating systems. It will guide the homeowner on what to look for before small problems become large ones and to help maintain home safety. Ultimately, it is the responsibility of the homeowner to ensure their home-heating oil tank is inspected and serviced by a certified oil burner mechanic to ensure safety and proper functioning.

Yukon Housing Corporation, Aboriginal Affairs and Northern Development Canada, the Yukon Government's Office of Building and Safety Standards, the Yukon Government's *Department of Environment*, the Yukon Fire Marshal's Office and any other party involved assume no responsibility for any consequences arising from use of the information provided in this guide. Any reliance or action taken based on the information provided in this guide is the sole responsibility of the user.

An Introduction to Slicky

This is Slicky. Everytime you see him in this guide he'll be giving you tips to help you keep your home and property safe from fuel oil leaks and to prevent related problems caused by fuel spills.



¹ A certified oil burner mechanic may also be called a certified oil burner technician, depending upon which province or territory granted their trade certification.

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Why should I read this guide?

There have been an increasingly high number of spills from home-heating oil tanks, resulting in very expensive clean-up costs.

Home-heating oil tank spills can result in contamination of soil, groundwater, and sewer systems. Clean up can cost tens of thousands of dollars and ground water can be rendered unusable for 20 years or more.



Did you know?

One drop of oil can render up to 25 litres of water unfit for drinking.

(Source: Environment Canada)

Indoor spills can cause extensive damage to your home and contents and the presence of harmful vapours can make the home unliveable for a lengthy period of time. Fumes can infiltrate homes through the sewer system, basement floor and foundation walls.

Home-heating oil tanks and piping need to be regularly inspected and maintained to prevent damage, corrosion and leaks.

Use of This Guide

This guide can help you to:

- Reduce the chance of an home-heating oil tank leak or spill
- Protect your home, property and the environment
- Reduce expensive clean-up and legal costs
- Manage risk to satisfy insurance requirements

This guide is not a legal document and is not intended to be a complete manual on the installation and maintenance of home-heating oil tanks and accessories. The information in this guide was created to supplement the annual inspection and service of your home-heating oil system by a certified oil burner mechanic.

Who is This Guide For?

- Homeowners, buyers, property managers, renters, band offices, and First Nation community members

What is the Primary Cause of Home-heating Oil Tank Leaks or Spills?

- **Microbial Influenced Corrosion (MIC)** is the internal corrosion of the steel in a home-heating oil tank by bacteria present in water that accumulates in the tank
- MIC is caused by bacteria that produce an acidic environment which accelerates the corrosion of the steel, and creates sludge which can plug oil lines and filters.
- Corrosion occurs primarily on the tank bottom where condensate water gathers
- Damage caused by MIC is easy to miss, as it occurs from the inside-out, in the form of pinhole leaks or tiny holes

Are There Any Other Causes of Leaks and Spills

Yes:

- Unprotected tanks and fuel lines
- Insufficient support and restraints
- Careless filling
- Lack of preventative maintenance

What You Should Know About Home-heating Oil Tanks:

Modern home-heating oil tanks are available in a variety of materials. Polyethylene and fibreglass models are more corrosion-resistant than steel, and are also UV-resistant.

Steel tanks can be fitted with a seamless polyethylene lining, to reduce the risk of internal corrosion by separating the steel from potentially corrosive tank contents.

These options are more expensive than a basic steel tank, but will greatly reduce the risk of spills.

What Can I Do?

- Follow the Home-heating Oil Tank Checklist provided at the end of this guide
- Enlist the services of a certified oil burner mechanic to do an inspection, provide expert advice and make repairs



Why should I check my home-heating oil tank?

The following events could have been avoided if the home-heating oil tanks had been properly inspected and maintained:

Case 1 - A tankful a month!

A homeowner thought it odd when he went through a full tank of home heating fuel in one month during the winter. When he called for a refill, the fuel delivery truck driver noticed that fuel had leaked onto the ground from the two-year-old above-ground home-heating oil tank under the deck.

Although the tank showed no obvious signs of failure – no loose fittings, no ruptures, no leaky seams – when the tank was picked up, the remaining fuel began leaking from the wall of the tank.

The clean-up cost was \$20,000 and the insurance company denied the claim. This was a low cost clean-up. Some clean-ups or remediations have been in excess of \$100,000.

Case 2 - Didn't think a new tank would fail

A homeowner with a recently installed above-ground tank returned home from work and smelled a faint odour of fuel. The homeowner examined the crawlspace to look for leaks and check the furnace but could not find anything. By morning, the smell was overpowering. When the owner checked the home-heating oil tank, there was a steady trickle of oil from a small hole in the bottom.

Two dump-truck loads of contaminated soil were removed and treated at a local facility. The excavator had to dig down to the footings and underneath the house to extract the contaminated soil in the crawl space.

The insurance company initially turned down the claim. With legal assistance, the homeowner was able to recoup \$30,000 of the cost and \$1,500 for a new tank. The insurance company did not cover the cost of legal fees.

Case 3 - Owners must pay for cleanup

A local government was faced with an oil spill at one of their houses and had to relocate the house to begin excavation. The contaminated material had to be transported to Whitehorse for treatment. The clean-up cost was over \$500,000 and the site must now be monitored as part of the clean-up requirements.

Since internal corrosion likely affected the life-span of the old, single-wall fuel tank, the local government is now replacing all single-wall metal tanks with double-walled fibreglass or polyethylene tanks that have a 30-year life expectancy. (Most insurance companies will not insure single-wall tanks anymore.)

Case 4 - Insurance doesn't cover everything...

A homeowner noticed that their furnace had stopped running and called a certified oil burner mechanic to investigate. The mechanic discovered the homeowner's heating oil tank had emptied onto the ground beside the house. Some of the oil had escaped under the house while the rest contaminated adjacent properties. The cause? Water had collected in the one-inch diameter drip leg of the home-heating oil tank, froze and then burst the drip leg. The entire tank contents (over 950 litres or 250 gallons) spilled onto the ground. The total clean-up cost was \$115,000, with the homeowner's insurance company covering only half. The homeowner had to borrow money from the bank to pay the remainder of the bill.





Preventative Maintenance Checklist

To function properly and safely, your home-heating oil tank should:

1

Be in a safe location and protected from physical damage

Install your heating oil tank as close as possible to your heating appliance. Your tank should be in a safe place, out of children's reach, where it will not be struck by vehicles or other physical hazards such as wind, falling trees, ice, or snow. Ensure that fuel lines are visible to prevent being stepped on and the fuel service provider has easy access to the tank for fuel delivery.

Outdoor Tank:

Protect your outdoor tank from physical damage and leave space around it for air movement and for ease of inspection of the tank. Remove plant growth in, under, and around your tank.

Ensure your outdoor tank does not block doorways or windows, including basement windows. As a courtesy to your fuel service provider, keep pathways and steps leading to your home-heating oil tank fill pipe free of snow and other debris.

Tanks must satisfy installation codes, building codes, zoning requirements, distance from property lines, power lines and power poles.

If your home-heating oil tank is located in an unsafe location, have it moved by a professional as soon as possible. If there is no other suitable location for the tank, get it protected with a solid, immovable barrier such as steel-concrete posts anchored into the ground, concrete barriers and/or overhead protection with snow guards on the roof.

Indoor Tanks:

Fuel oil that is stored indoors is kept warm and burns more efficiently. Indoor tanks are also protected from hazards such as falling ice and snow, internal corrosion from condensation, vandalism, ground shifting, running water and vehicle impacts.



Vehicle bumpers could contact this unprotected tank. It is likely leaning due to a bumper having pressed against it.



Protect the tank from vehicle impact with posts if no other location is possible.

If you have an indoor tank, place it in the lowest level of the building, such as a crawlspace or basement. If you locate it elsewhere, (inside an attached garage that is not the lowest floor), ensure that it is inside an extra container at least the same size as the tank, or on a drip pan fitted with an alarm. If this isn't possible, use anti-siphon valves. Regardless, an extra system of containment is a good idea.

Your indoor tank should be inspected regularly for signs of leakage, oil stains and odours in the basement. Vent and fill pipes must terminate outdoors to prevent fuel leaks or vapour intrusion into the living space.

Oil vapours are not only dangerous from a combustible viewpoint but are a potential health hazard to occupants and can cause headaches, nausea, dehydration, and dizziness.



An indoor tank with secondary containment. Notice the fill and vent pipes terminate outdoors.

Underground Tank:

Most insurance companies no longer provide coverage for underground tanks. Please check with your insurance provider.

Contact the Yukon Fire Marshal's Office at (867) 667-5230 for information on how to remove an underground tank or, if the tank cannot be removed, how to correctly decommission the tank in place. For B.C. residents, please contact your local Fire Marshal office.



Removing or replacing an underground tank is never a simple process – even if machinery can easily access the location. Contact a certified oil burner mechanic for information on requirements to correctly disable an underground tank if it cannot be removed.



Have protection for fuel lines and fittings

A fuel line connects your heating oil tank to your furnace or boiler. Your fuel line should be as short as possible and protected from physical damage. If you must use a long fuel line, ensure it is structurally supported along the entire length to prevent shifting and rupturing. There should be easy access to the line for periodic inspection.

All fuel line connections, including connections to the oil filter, must be tight. Connections that appear dirty or dark could be a sign that oil is beginning to weep. These connections should be checked by a certified oil burner mechanic.

Oil filters are located between your burner and home-heating oil tank and filter out dirt and impurities. **They should be located indoors** near your heating appliance and should be changed yearly. Filters should not be located outside as they filter impurities in the oil, including water, which can freeze and rupture the filter housing. You should conduct regular inspections of your fuel lines and schedule annual inspections by a certified oil burner mechanic, not only to have any water removed but inspected as part of your best practices!

Buried single-wall fuel lines are no longer permitted because they are susceptible to rupturing and are difficult to inspect. Ruptures in underground fuel lines can go undetected for months or even years. These leaks can create huge spills over time and result in costly clean-ups.

Prevent Falling Ice and Accumulated Snow

Protect your fuel lines and home-heating oil tank from falling ice, especially if they are below the slope of a roof. Get the lines re-routed by a professional if the lines are subject to this hazard, or find a way to shield them such as installing snow guards on the roof.

Accumulated snow can add unnecessary weight to the tank. Drifting snow can hide a fuel line making it susceptible to rupture or damage. A rupture is most likely to occur along the weakest, unsupported section of line, typically adjacent to the tank.

Clear snow away from the tank and fuel lines and ensure the lines are visible to prevent accidental damage. If necessary, have your home-heating oil tank and lines moved to an area that is less subject to drifting snow or snow accumulation. If a leak occurs while the line is buried in snow, it can remain undetected for months.



Keep the area around tanks clear of snow to eliminate the chance of someone accidentally stepping on the fuel line and allowing the fuel supplier access to the tank for filling and inspection.



Remember:

- Protect fuel lines from being stepped on, kicked or bumped accidentally
- Protect fuel lines from vehicles, lawnmowers, getting caught by garden hoses or extension cords, or children playing.
- Prevent fuel lines from coming into contact with corrosive material
- Ensure fuel lines buried in cement are inside secondary containment tubing or replaced with above-ground lines, and the abandoned lines purged of oil
- Protect interior fuel lines from physical damage – especially if they run across the floor to the burner. If possible, cover them with permanently secured protection plates
- Replace copper lines that are kinked



3 Use Proper Support and Restraints

Follow Seismic and Flood Restraint Requirements

An average full home-heating oil tank (950 litre capacity) weighs about 807 kilos. In the event of an earthquake, the tank could topple or the stand could collapse. Tank stands, pads and restraints must withstand these forces and must be cross braced and bolted (with proper authority's approval) to a solid concrete pad to prevent tipping. The ideal foundation for a tank is a large reinforced concrete pad with the metal tank or tank stand firmly bolted down.

Home-heating oil tanks must meet the seismic restraint requirements for the seismic zone you live in. Ensure your home-heating oil tank is installed in accordance with the Residential Home-Heating Oil Tank Restraints for Yukon Communities. Follow seismic and flood restraint requirements, found here: <http://www.community.gov.yk.ca/buildingsafety/forms.html>

While at the website, scroll down to Residential Fuel Tank Restraints for Yukon Communities to select your community.



Remember:

Wooden tank stands are prohibited by the Building Code and should never be used.

Patio stones or sidewalk blocks should not be used as a base for the foundation of any home-heating oil tank because they do not provide enough stability.

Never fasten the home-heating oil tank to the wall of a building because wall construction is not strong enough to hold the tank in place. A proper base with a solidly connected tank and tank stand is the best defense against tipping and spilling.

The ground under the tank must be non-organic, undisturbed and well compacted to prevent settling of the pad over time.

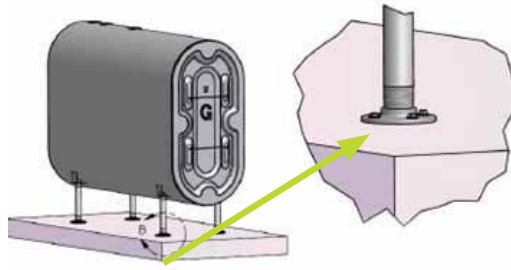
Tank Supports and Foundation

The area around and under the pad should consist of material that will allow water to drain away from the tank. If water is allowed to accumulate, the freeze and thaw movement of the pad can cause movement which will damage piping or even topple a tank.

Home-heating oil tanks can also topple over during the spring thaw if the flow of melted water compromises tank bases and stands. Place the concrete pad out of the path of spring water channels.

Older tank installations that have tank saddles instead of pipe legs supporting the tank are prone to collapsing, as these supports retain water and promote rust between the tank saddle and tank bottom.

Approved Tank Restraint Systems:



Tank legs must be secured to the slab or pads.



A properly installed fiber glass tank on a solid pad with restraints to keep it from toppling in a seismic event. The restraint system must be engineered or follow certified designs for the local area.

For details, contact Yukon Community Services, Building and Safety Standards Branch.



A double-bottom home-heating oil tank on reinforced concrete pads placed on a compacted, granular base.

4

Be sloped towards the outlet

Your home-heating oil tank should slope 1/4 inch per foot towards the outlet to aid in water drainage and to prevent corrosion within the tank.

Do not slope the tank away from the outlet as water and sludge will collect in the tank where it cannot be drained or removed easily. This water and sludge accumulation will contribute to corrosion.

A tank with a bottom outlet is better than a tank with an end outlet. A bottom outlet allows accumulated water to easily exit the tank and run to the filter to be collected.

Note: A fibreglass/polyethylene tank can be installed horizontal without a pitch.



Notice the top of this tank slopes towards the left side of the picture. This tank also has a bottom outlet. These two features will keep water from accumulating and causing corrosion in the tank. The arrows in the picture illustrates the correct slope of the tank towards the outlet.

Protect your tank from oil leaks by:



Keeping your home-heating oil tank full to reduce condensation

A full home-heating oil tank helps to reduce water condensation. Whenever air temperatures rise, water condenses on the cooler surfaces of the tank including the inside. The fuller the tank, the less surface area there is for water accumulation. The water runs down the inside tank walls and collects on the bottom of the tank. Microbes flourish in this environment and accelerate corrosion on the tank's bottom. This is called Microbial Induced Corrosion (MIC) and was discussed earlier in this guide.

The bacteria also generate sludge which can plug oil filters and cause heating appliance problems.



Remember:

- Bacteria need water to grow
- Keep the tank as full as possible (80%) to minimize condensation, especially in the summer months, but if your tank is susceptible to overfilling remember to leave an unfilled space (headspace) at the top
- Headspace in the tank allows for fuel expansion without causing leaks
- Slope the tank towards the drain to allow water to flow out of the tank and be captured in the fuel filter
- Use a tank that drains from the bottom instead of from the end of the tank to drain water
- Use a home-heating fuel additive to displace the water; it will also help eliminate sludge and bacteria

Warning:

If your tank exhibits a dark line of corrosion along the very bottom of the interior this is an indicator of MIC inside your tank. Do not touch this dark line as your tank could be perforated and begin to leak. You should contact a professional to replace your tank as soon as possible.

Pay Attention to Temperature Change

Leaks can occur when the fuel in a tank expands due to warmer temperatures. If there is not enough expansion room or headspace at the top of the tank, the fuel will expand, back up the fill pipe, and spill onto the ground. These spills are usually small, yet can have the same effect as a larger spill if they happen regularly.



Remember:

One drop of oil can render up to 25 litres of water unfit for drinking.

The most effective way to ensure there is ample headspace between the fuel level and the top of the tank is to use an oil level gauge and a vent whistle.

It is the responsibility of the fuel delivery person to not overfill the tank.

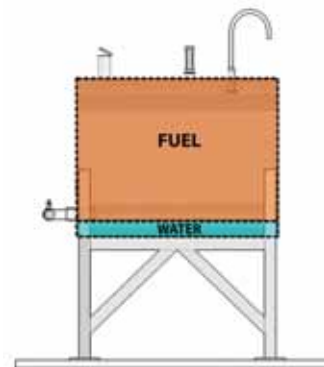
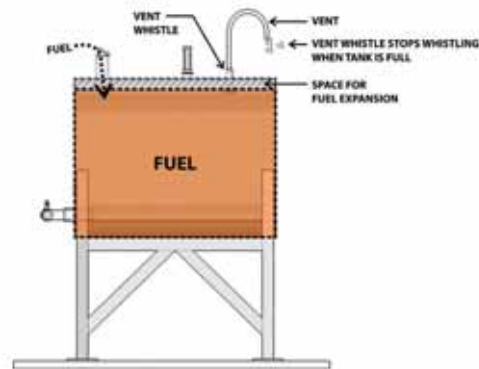
Vent Whistle

A vent whistle will ensure your tank retains the required headspace when filled. A vent whistle is a device that fits directly onto the home-heating oil tank at the base of the vent pipe. It whistles like a tea kettle while the tank is being filled. The noise stops once the level of oil reaches the bottom of the whistle inside the tank. This signals that the tank is full (with some head space) and the delivery person can turn off the flow of fuel.

Your fuel delivery person can advise you if your vent whistle is working properly. This is not an adjustable device. Contact a certified oil burner mechanic if you are told or notice your tank whistle is not working properly.



Picture of a vent whistle component. The silver portion of the whistle is unseen inside the tank. When the level of the oil reaches the bottom of this tube, the whistling stops.



Note the method in which fuel leaves both tanks (end-wall feed configuration). The drawback to these tanks is that water and sludge can accumulate as pictured in the bottom tank. Bottom-feed systems have recently been introduced to eliminate this condition.

Ensure Your Fuel Oil Level Gauge is Working

All tanks must be fitted with a functional fuel oil level gauge. This is critical for the fuel delivery person.

The easiest way to ensure your fuel oil level gauge is working correctly is to monitor it for a few weeks during the winter. If the reading does not change, there may be a problem with the gauge. Gauges can get cracked, stuck or frozen. If the display glass is cracked, water can leak into the top of the tank. Broken or malfunctioning gauges should be replaced or repaired as soon as possible. The gauge should be equipped with a heavy gauge steel protector to prevent damage.

A cracked or missing gauge is especially dangerous for indoor home-heating oil tanks. A broken gauge may allow fumes or liquid oil to enter a house, and may prevent the vent whistle from whistling (since the air escapes through the broken gauge and not through the vent whistle).



Picture of a glass gauge.



Picture of a heavy gauge steel protector.
This will keep your glass gauge safe.

6

Detecting water in your tank

Sludge and water accumulate on the bottom of the tank and can be checked by dipping the tank using “water finding paste” at the end of a dipping stick, like checking the oil in your car. If the paste turns a different colour, as indicated on the product box (usually purple), the home-heating oil tank has water in it.



Test for Water

The most current version of the code recommends that “*all tanks located in unconditioned space or outdoors shall be tested for water at the bottom of the tank. Where found, the water shall be removed.*” (B139-09 clause 15.2.3)

7

Adding a fuel additive before fill up

Add a fuel additive to displace small amounts of water in the bottom of the home-heating oil tank. Some additives contain biocides which kill and decompose bacteria preventing sludge from forming. Additives also assist in clearing your tank of water and sludge if they are present.

If any water is discovered in your tank during an inspection, it should be removed immediately by a professional.

8

Removing water before freeze up and after spring thaw

The following procedures should not be attempted by the homeowner. A certified oil burner mechanic or fuel delivery person should have the training and the tools to avoid creating an oil spill, and is conversant with regulations related to fuel oil storage and disposal of contaminated fuel or hazardous materials.

Home-heating oil tanks should have accumulated water removed every spring. The most serious corrosion damage to home-heating oil tanks occur in the non-winter months when the water is not frozen. Corrosion forms from the inside out at the bottom of the tank, due to the accumulation of water.



Remember:

Keep your tank full at the beginning of summer to reduce condensation inside the tank.

In some installations a drip leg may be used to collect accumulated water. The drip leg should never be used to support a tank. If the drip leg touches the ground or extends below the level of the tank pad, it must be removed (*B139 code requirement*).



The green arrow points to an example of a drip leg. Since drip legs are not easy to maintain, **we do not recommend using them**. It is better to eliminate water in the tank rather than letting it drain into the drip leg, where it can freeze and rupture.



9

Checking the tank's physical condition regularly

Check the home-heating oil tank's exterior surface for rust, corrosion or dents that may weaken or make the tank susceptible to rupture and leakage. Look for bent or pinched lines, cross-threaded fittings, a broken or cracked fill gauge, cracked or weeping weld seams, or broken or heaved base support pads.

Even if the tank looks okay from the outside, the steel on the inside may be extremely thin and weak in areas due to internal corrosion. Be careful when running your hand over rust bubbles or spots on the tank. Do not attempt to remove rust or paint. Do not clean the bottom or sides of your tank when it contains oil.



Remember:

The most serious corrosion damage to home-heating oil tanks occurs from the inside out at the bottom of the tank, due to water build up. **If you notice a dark line along the bottom of your home-heating oil tank, have your tank inspected without delay to determine if it needs to be replaced.**

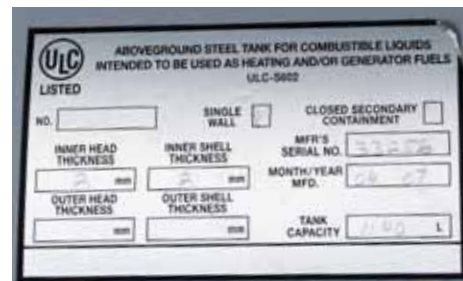
Check Certification Plates

Check for a metal certification plate that shows ULC (Underwriters' Laboratories of Canada) or CSA (Canadian Standards Association). Most insurance companies require proof of this certification before they will provide homeowner coverage.

Consult a certified oil burner mechanic if you don't have documentation in your home files or on the tank to show that your tank has been installed in accordance with *CAN/CSA B139 – Installation Code for Oil-Burning Equipment*. For most homeowners, this information is itemized on the building inspection report.



ULC certification plate, standard, double-wall, steel above-ground home-heating oil tank.



ULC certification plate, standard, single-wall, steel above-ground home-heating oil tank.

10

Looking for drips and ground staining



Ground staining may be a sign that fuel is dripping, leaking or has been spilled from the home-heating oil tank. Any evidence of leaks or spills should be investigated and only repaired by a professional **immediately**.

Remember:

It is the owner's legal responsibility to have contaminated soil remediated. It is everybody's responsibility to report spills to the spill line (**see page 43**).

*See Government of Yukon Environment Act, page 40.



Obvious soil staining.

To protect the floor below an indoor home-heating oil tank, a drip tray should be placed under the whole tank, or under the valve and filter to catch potential oil drips. Some of these devices come with built-in-alarms to alert the homeowner if a leak occurs.



A drip pan under the filter inside a dwelling. The entire tank could have a pan installed beneath it for better protection. Note the appearance of fuel staining on the tank.

Potential home buyers are advised to inspect the area around the home-heating oil tank for signs of past fuel spillage. This will make clean up a condition of purchase instead of the new homebuyer being responsible for potential cleanup costs in the future. The inspection should be followed up by a certified oil burner mechanic, a qualified home inspector, or engineer if there is suspected contamination.

11

Checking fittings, valves and fuel lines

All fittings and valves should be inspected regularly for rust, corrosion or other physical defects. Be sure to check for signs of leakage or weeping—a thin film of oil developing around the joints. If you find or suspect any of these defects, contact a certified oil burner mechanic to inspect and have repairs completed immediately.



This break is obvious—most are not. A close inspection of piping should be carried out on a regular basis.



Remember:

It is a legal requirement to have a functioning, approved, shut-off valve as close to the tank outlet as possible.

There are Two Types of Manual Valves:

1. Gate valves were often used in the past, with a round handle like a small steering wheel. A gate valve is prone to leaking around the stem if partially open, so always ensure that valves are either fully opened or fully closed.
2. Ball valves are more common now in newer installations. These valves have a single lever.



Automatic Valves

Automatic valves (which include anti-siphon valves) are also used, but not required on most home-heating oil tank installations. The automatic valve is usually installed in addition to a manual valve. These valves will not allow fuel to flow free from a tank if piping develops a leak.

Fusible Link / Anti-siphon Valve

A fusible link valve is an optional safety valve designed to shut off the fuel supply in the event of a fire. Typically, a fusible link valve is installed at the furnace.

Anti-siphon Valve

It is advantageous to have an automatic valve located at the tank when the tank or oil level is above the height of the oil burning appliance - for example when a tank is installed inside an attached garage with the furnace in the basement. The following clauses from the B139 Code provide the requirements for the use of an anti-siphon valve:

6.4.5 c When the total capacity of tanks connected to one supply line exceeds 2500 litres (550 gal), all connections for the transfer of oil to and from the consuming appliance shall be situated at the top of the tank, transfer shall be by pump only, and means shall be provided to prevent siphoning, except where oil types #5 and #6 are used.

A suitable, automatically operated device, designed to shut off the fuel supply in case of breakage of the supply piping, shall be installed when more than one burner is supplied from a single pump set.

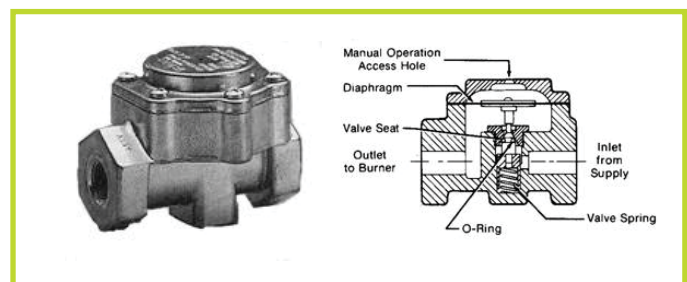
Note: This requirement provides protection if the supply piping between an upstream pump and the burner is broken.

These valves operate with the use of a diaphragm that requires a minimum suction draw from the pump at the appliance before fuel is allowed to pass through it.

Without a sufficient vacuum draw from the pump, oil cannot free flow from the tank by the siphoning action of a broken line. These valves are commonly referred to in the oil industry as an “oil safety valve” or OSV, although the term is actually a trademark of Webster Industries.



An example of an anti-siphon valve for a top of tank fuel hook-up.



This is an example of an automatic shut off valve.



Check Fill and Vent Pipes & Use a Rain Cap to Keep Water Out

Check your fill and vent pipes. The height of the vent pipe above the fill pipe must be at least 6 inches, although it is recommended that it be at least 12 inches higher than the fill pipe. Ensure the home-heating oil tank vent pipe is clear and free of obstruction. Clear snow, leaves, insect nests and other debris from the fill and vent pipes to allow the tank to vent properly and to ensure accessibility for the delivery person. Inspect the fill and vent pipes and the area around the tank for spills, before and after each fill.

Both fill and vent pipes should be fitted with rain caps to prevent water from entering the tank. A rain cap should be attached to the fill pipe with a hinged or threaded configuration to prevent accidental loss of the cap. Vent caps prevent rain water from entering the tank, but allow air to escape. Most caps can be locked to prevent tampering or theft of heating oil.

After each fill, ensure the rain cap is secure. If your cap is broken, replace it with a proper cap.



A screw-on rain cap is commonly used in Yukon - effective if secured after every fill. Be sure to replace this cap should it be lost.



Example of various tank components. From bottom to top: 1) filler cap, 2) oil return, 3) fuel gauge, 4) leak detection port, 5) vent (with vent whistle), 6) double walled tank interstitial vent.



An example of a lockable flip open rain cap. These can be purchased at fuel tank supply stores.

Flex Connectors

Flex connectors are designed and intended to allow for minor shifting of either the home-heating oil tank stand or the building. They are not intended to compensate for misaligned fittings.

A flex connector or a horizontal loop of tubing allows for expansion, contraction and minor movement in the line from the tank to the building and should be well protected.

A properly installed flex connector should be in an “S” shape to accommodate any shifting. It should never be aligned in a straight line.



A flex connector installed correctly. Note the handles have been removed for the gate valves to prevent children and vandals from tampering with them.

Flex connectors are often used at the burner to compensate for vibrations. They must be free to flex – and must never pass through a floor or wall.



The lines to this burner are flexible and allow minor servicing of the burner without disconnecting lines and spilling oil.



The loop in this oil line serves the same purpose as a flex connector and is more common. The loop of copper tubing will compensate for movement in the tank without leaking. (note – this fuel line and shut-off valve could easily be stepped on and should have a protective covering).

Check Flex Connectors

The steel weave or corrugation on the exterior of the flex connector provides its strength. It must fit tightly around the inner lining. The flex connector should not be compressed along its long axis. You can check this by grasping it with your hand. If the metal weave is loose, and you can compress the weave by hand, then the flex connector needs to be replaced.

*The use of flex connectors is fairly rare in Yukon. There is no legal requirement to use them.

12

Booking an annual inspection by a certified oil burner mechanic

Call a certified oil burner mechanic to conduct an annual inspection of your heating system, including the home-heating oil tank and fuel lines.

Have your oil burning appliance serviced and a combustion analysis completed. The mechanic should, (as required in the oil code *CSA B 139*) carefully inspect the integrity of the combustion appliance, heat exchanger and flue (chimney).

A standard inspection checklist for home-heating oil tanks and furnaces is on the Yukon Community Services website at http://www.community.gov.yk.ca/buildingsafety/oil_fired_reg.html



Remember:

Fuel oil within the heating system becomes a hazardous material if it leaks out. **It costs less to prevent an oil leak than to fix or clean up a spill.**



End of the road? Don't take the risk. Book an inspection.

13

Addressing problems immediately when they arise

Insurance Company

Insurance policies may or may not cover the costs associated with a home heating oil spill. Insurance companies may refuse to pay for the clean up if a spill was preventable (i.e. if the homeowner or resident did not take proper precautions and conducted routine regular inspections and maintenance).



Remember:

Homeowners should always consult their insurance company to see what their policy covers, and their obligations in terms of personal responsibility and liability.

When insuring your home, insurance companies will ask for a checklist or questionnaire to be completed regarding the oil burning storage system and appliances. These checklists or questionnaires are seldom completed accurately and could result in a claim being refused. If you need assistance to complete these forms, contact a certified oil burner mechanic and have this done by an expert.

Ask questions! Many insurance companies cover only limited costs associated with oil spills. Your policy may provide coverage for clean-up in your neighbour's yard, or damage to your house, but it may not cover your own yard. As clean-up of contaminated soil can be extremely expensive, find out exactly what your insurance policy covers.

As a general rule, if the spill was preventable with regular maintenance and inspections, insurance policies are unlikely to cover clean-up costs.

Many Insurance Companies are Now Inspecting Tanks Prior to Insuring Them and Require Home-heating Oil Tanks to:

- be free of rust and have no signs of leakage
- have proof of certification plates, often from a specified certification body (ULC or CSA)
- be located off the ground (as per Seismic Restraint Requirements, see page 9).
- have fuel lines protected by a cover
- be located away from high traffic areas
- be inspected by a building inspector when installed

Fuel Company

The person delivering the heating oil is required to stay with the fuel nozzle at all times during the re-fuelling of your home-heating oil tank, even though fuel delivery nozzles are equipped with an automatic shut-off to prevent spills.

There is no substitute for human supervision. Incorrect practices should be reported to the fuel company immediately.



Remember:

To avoid unintentional spills, personally filling your home heating oil tank in-between deliveries is not recommended. It is also important to know that when a tank has “run dry”, elevated amounts of sludge and water can enter your fuel line, fittings and filter. This is a concern in the colder months as your lines and fittings can freeze once the furnace shuts-off due to a lack of fuel.



An overhead view of a residential fuel oil spill being remediated.



This double-wall fiberglass tank is also fitted with an inspection port to check for leakage.



This drawing illustrates the structure of a double bottom tank. The area most subject to corrosion is the tank bottom. These tanks are fitted with an inspection port which allows you to see if the tank has failed.



Fiberglass single-wall home-heating oil tank. Note the protective shield over the fuel outlet valve and piping.

*Note: All of the tanks above do not have seismic restraints and do not adhere to code.



Tips for replacing your home-heating oil tank

When it is time to replace your home-heating oil tank, consider the high environmental and financial cost of an oil spill when making your new purchase. **All homeowners, including First Nations governments and communities, are urged to place a high priority on quality.**

Consult with your insurance company to determine what type of professional installation they will cover. Contact a certified oil burner mechanic for advice on the most appropriate home-heating oil storage system.



This guide recommends replacing your old tank with one that meets the new Canadian Standards Association (CSA) standards for home-heating oil tanks, such as a double-wall or double-bottom tank. Some installations are using fibreglass tanks, which come in single and double-wall configurations, both of which are acceptable.

When Replacing Your Home-heating Oil Tank, Several Options Exist:



Single-wall Steel Home-Heating Oil Tanks are not recommended.

These tanks are susceptible to corrosion from both the outside and the inside of the tank.²



Double-wall or Double-bottom Steel Home-Heating Oil Tanks

Double-wall steel tanks are more expensive than single-wall tanks, but are more durable. If the inner wall corrodes, oil will fill the outer tank and not spill onto the ground. Water must still be drained from the inner tank on a regular basis to minimize corrosion. A double-wall tank must be fitted with an inspection port to allow for easy, regular monitoring of the interstitial space for any signs of leaks. A double-wall tank may last longer than a single-wall tank, but will still eventually fail and need replacing. Keep an eye on the inspection port.



Single-wall or Double-wall Fibreglass Home-Heating Oil Tanks

Fibreglass home-heating oil tanks have many attractive features but are more expensive than typical steel tanks. These home-heating oil tanks do not rust and corrode like steel tanks and typically last longer. Fibreglass tanks come in both single-wall and double-wall construction and are lightweight compared to steel tanks. As with all tanks, accumulated water should be drained on a regular basis to help prevent the formation of sludge in the oil storage system. Double-wall tanks should be fitted with an inspection port.



Double-wall Polyethylene/Steel Home-Heating Oil Tanks

Similar to the double-wall steel tank, this tank has a space between the two tank walls. The inner tank is made of high density polyethylene. The outer wall is made of galvanized steel that is resistant to exterior corrosion. The tank can be fitted with an optical leak alarm. The outlet for this tank is on the top rather than on the bottom or the end of the tank.



Second-hand Home-heating Oil Tanks

Purchasing second-hand or reusing home-heating oil tanks for any new installation is NOT permitted by code.

Building inspectors cannot provide approval on used or second hand oil tank installations, and insurance companies will not insure them.

Home-heating oil tanks must be properly disposed of once they have reached the end of their life cycle. Talk to a professional about the disposal of your home-heating oil tank.

Transferring Oil into a New Tank (prohibited under CSA B139-09)

When replacing your home-heating oil tank, it is **not recommended** to transfer the old fuel into your new tank unless it is filtered. The old fuel may contain sludge, acid, microorganisms and water which will give corrosion a head start on causing problems. Contact your fuel provider for questions about transferring fuel.

The remaining sludge, oil and water mixture is considered a special waste and must be disposed of as required under the "Special Waste Regulations". Contact your fuel supplier for more information.

2. CSA recently amended the Installation Code for Oil-Burning Equipment. At time of publication, the revisions were not yet in force in Yukon. However, we anticipate that in the near future all above ground metallic home-heating oil tanks will be required to be double walled, double bottomed, or be installed within secondary containment. Single-walled steel tanks will not be permitted.



Home-heating Oil Tank Installation, Movement and Leveling

Do not move a home-heating oil tank! Moving a home-heating oil tank increases the opportunity for damage and tank failure. If you need to move your tank, wait until it is empty and call an expert!

Tanks shipped directly from a manufacturer come with temporary transport sealing plugs to keep water out and protect the fitting threads. **All** caps/plugs must be removed and replaced with proper fittings. Any condensation or ice formed in the tank during shipping and storage should be removed before installation. The tank should never be filled until it is properly installed and inspected by a qualified installer or by an accredited inspector.



Tanks are shipped with protective plugs. This tank also needs to be painted during installation to reduce the formation of exterior surface rust.



Remember:

Painting a tank should only be completed when it is first installed. Never repaint an old tank.





Home-heating Oil Tank Spills

If you're faced with a leak or an oil spill, follow these steps:

First Response - outside leak or spill

- Stop the flow of oil at its source
- If the leak is in the oil line, turn off the shut-off valve at the tank outlet
- Plug the hole, if it is safe to do so
- Place a container under the oil leak and monitor the fuel level in it
- Contain spilled oil using whatever materials are available (pails, rags, newspapers, peat moss, cat litter, absorbent pads, sheets of plastic, etc.). Never flush spilled oil or contaminated materials down the drain or sewer
- Use absorbent material to mop up the spill
- Turn off your furnace to keep it from attempting to ignite without a fuel supply
- Call the 24 hour Yukon Spill Report Line 867-667-7244 (collect calls are accepted) or B.C. 1-800-663-3456
- Call your heating oil supplier for transferring remaining oil from the leaking tank
- Contact your insurance company as soon as possible
- Take pictures of the spill and record details



Remember:

Not reporting a spill is an unlawful act!

First Response – inside leak or spill

- Turn off the power to your furnace at the emergency switch for the oil burner
- Turn off the shut-off valve at the tank outlet
- Plug the hole, if it is safe to do so
- Watch for floor drains; prevent fuel from entering
- Heating oil is a combustible liquid and the vapours are highly flammable, so eliminate all ignition sources (smoking, flames or any electrical appliance located in the vicinity of the leak)
- Fumes from spilled oil can accumulate in confined spaces and be very dangerous – be aware
- Contain spilled oil using whatever materials are available (pails, rags, newspapers, peat moss, cat litter, absorbent pads, sheets of plastic, etc.). Never flush spilled oil or contaminated materials down the drain or sewer
- Never use a shop vacuum to clean contaminated fuel material – the electric motor will spark and cause ignition of the vapours
- Put contaminated materials into a metal container with a proper lid and store outside to prevent possible combustion and ignition of the contaminated material. Never store this container inside your living space!
- Call the 24 hour Yukon Spill Report Line 867-667-7244 (collect calls are accepted) or B.C. 1-800-663-3456
- Call your oil supplier for transferring any remaining oil from the leaking tank to a suitable container
- Contact the Environmental Programs Branch and your local fire department for information on how to store and dispose of contaminated materials (see yellow pages/ phone book – Oil Spill Clean Up & Control)
- Contact your insurance company as soon as possible

These actions will minimize the impact of the spill on the environment, your property and your neighbour's property.



An obvious home-heating oil tank spill. The extent of the spill needs to be determined.



Rust and pitting like this means that this tank is at the end of its life, get it replaced!



Testing will determine the extent of excavation required to remediate this spill.

Clean-up and Next Steps

Clean-up consists of the removal and disposal of contaminated soil and possible replacement of your home-heating oil tank.

The clean-up must be done with instruction from the Government of Yukon's Environmental Programs Branch, and in most cases, is carried out by a contractor trained and licensed to handle environmental waste. It may be necessary to have an engineering firm assess the extent of the spill and provide instruction on the clean-up required.

After the clean-up is completed, installation of a new storage system and/or piping should be done by a certified oil burner mechanic.

For every installation, a building permit is required. Once completed, this work needs to be inspected by a City of Whitehorse or Government of Yukon inspector to ensure it complies with all codes and standards.



Engineer testing level of contamination in the soil.



Sample bottles prepared for testing lab to determine parts per million of oil in contaminated soil.



The Final Word!

If in doubt, call a professional!





What the Law Says

Government of Yukon Environment Act



Remember:

The Environment Act is based on the “polluter pays” principle. (i.e: the person who owns or has possession, charge, or control of the spilled substance is responsible for the clean-up.)

It is the legal and financial responsibility of the person responsible for the spill to clean up all home-heating fuel leaks and spills on all properties, drinking water systems and waterways.

The Environmental Programs Branch (EPB) of the Government of Yukon is responsible for developing and implementing legislation and policy under the Government of Yukon *Environment Act*. This includes ensuring that spills and contaminated sites are assessed and remediated.

EPB will direct the responsible party to restore the affected area to a condition reasonably equivalent to what existed prior to the spill. The *Environment Act* applies to all lands in the Yukon including private land.

Other Government of Yukon Legislation

- Spills Regulations
- Contaminated Sites Regulation
- Storage Tank Regulations
- Special Waste Regulations

The above listed legislation and regulations are available at <http://www.gov.yk.ca> or by contacting your local Government of Yukon Environment Office.

Canadian Standards

For most provinces and territories, the CAN/CSA B139-04 or B139-09 Edition of the – Installation Code for Oil-Burning Equipment is in force.

Canadian Standards Association (CSA)

Canadian Standards Association, Installation Code for Oil Burning Equipment (CSA B-139-04).

<http://www.shopcsa.ca>

Canadian Standards Association, Installation Code for Oil Burning Equipment (CSA B-139-09)

<http://www.shopcsa.ca>

Underwriters Laboratories of Canada has been publishing standards for Canadians for 60 years and provided technical expertise to manufacturers. A ULC mark on a product means that ULC has tested and evaluated representative samples of that product and determined that they meet ULC's requirements. In addition, products are periodically checked by ULC at the manufacturing facility to make sure they continue to meet ULC requirements.

Underwriters' Laboratory of Canada (ULC)

Aboveground Steel Tanks for the Storage of Combustible Liquids Intended To Be Used as Heating and/or Generator Fuels

National Standard of Canada. CAN/ULC-S602-03,

<http://www.orderline.com/detail.asp?group=448>

Underwriters' Laboratories of Canada

Aboveground Non-metallic Tanks for Fuel Oil

ULC/ORD-C80.1-00,

Canadian Underwriter—Canada's Insurance and Risk Magazine

For complete article – **“Total System Containment”**

<http://www.canadianunderwriter.ca/issues/story.aspx?aid=1000389788>

Seismic Restraint Engineered Drawings

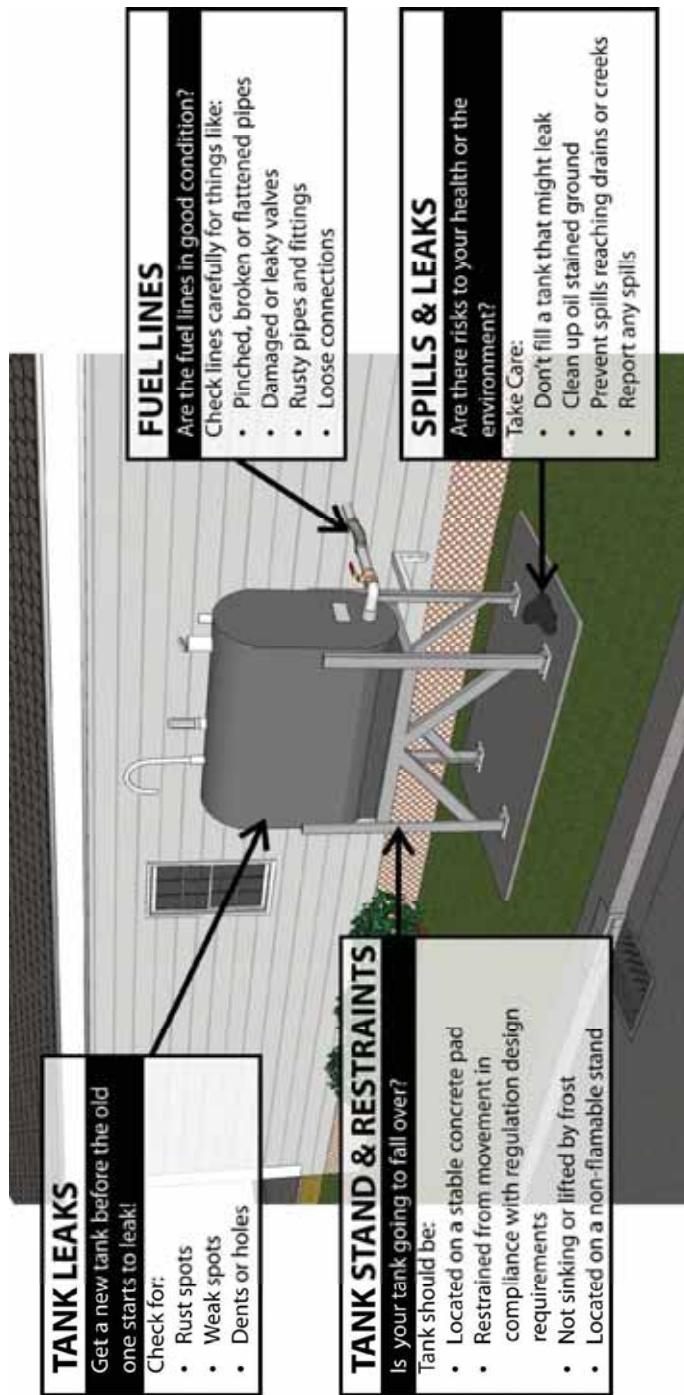
The tank must meet the seismic restraint requirements for the seismic zone you live in. Refer to the following website for seismic restraint engineered drawings specific to your location.

<http://www.community.gov.yk.ca/buildingsafety/forms.html>

Scroll down to - Residential Fuel Tank Restraints for Yukon Communities and select your community.

Contact Government of Yukon Building and Safety Standards Branch at (867) 667-5741 or City of Whitehorse Building Inspections at (867) 668-8340.

Appendix 1 Inspection Checklist



TANK LEAKS

Get a new tank before the old one starts to leak!

Check for:

- Rust spots
- Weak spots
- Dents or holes

TANK STAND & RESTRAINTS

Is your tank going to fall over?

Tank should be:

- Located on a stable concrete pad
- Restrained from movement in compliance with regulation design requirements
- Not sinking or lifted by frost
- Located on a non-flammable stand

FUEL LINES

Are the fuel lines in good condition?

Check lines carefully for things like:

- Pinched, broken or flattened pipes
- Damaged or leaky valves
- Rusty pipes and fittings
- Loose connections

SPILLS & LEAKS

Are there risks to your health or the environment?

Take Care:

- Don't fill a tank that might leak
- Clean up oil stained ground
- Prevent spills reaching drains or creeks
- Report any spills



Remove water and sludge from your tank every year.



Remove grass, weeds, snow and ice from around your tank.



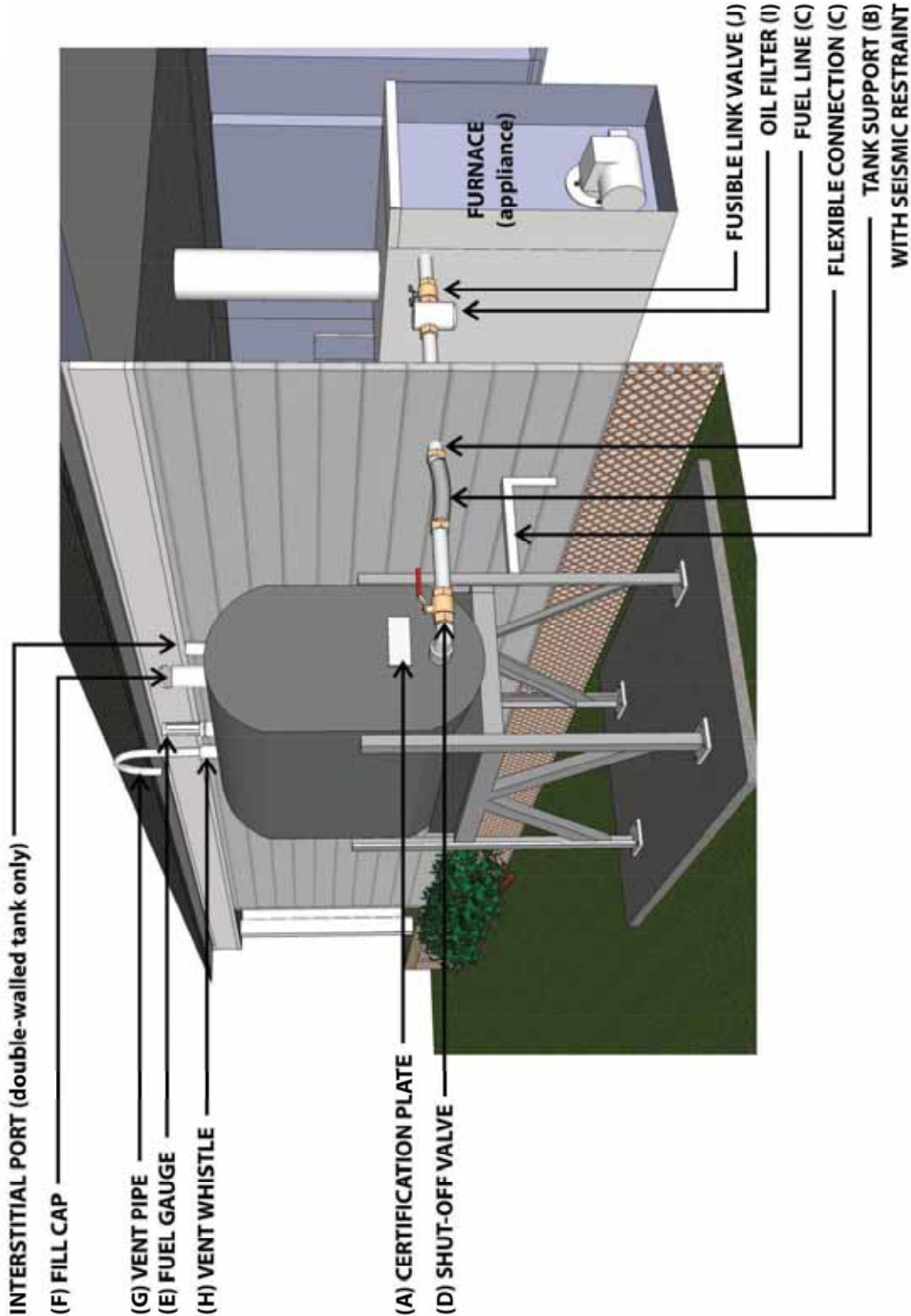
To prevent overflowing and to allow for heat expansion, only fill your tank to nominal capacity (~80%).

Make it easy to see if you have a leak and easy to fix it if it happens.

Keep your tank filled during spring and summer to minimize condensation.

Add a fuel conditioner to remove bacteria and displace water.

Appendix 2
Tank Components





Additional Information

CSA-B139 “Installation Code for Oil Burning Equipment”

All home-heating oil tanks and associated appliances, equipment, components and accessories must be installed and satisfy the requirements of the current edition of CAN/CSA B139 “Installation Code for Oil Burning Equipment”. This code is referenced in the National Building Code of Canada.

In Yukon, the latest version of the “Installation Code for Oil Burning Equipment” CAN/CSA B139 -09 has not yet been adopted. Yukon currently uses *B139-04*.

Certification Plates

All home-heating oil tanks must comply with tank standards accepted under the B139 Code.

The two most common tank standards are the *ULC-S602 Standard for Aboveground Steel Tanks for Fuel Oil and Lubricating Oil* and the *ORD- C80.1 Standard for Aboveground Non-metallic Tanks for Fuel Oil*.

Older Installations

Previously installed tanks should have been installed in accordance with the applicable edition of B139 Code which was in effect at the time of installation, as well as the tank manufacturers' certified instructions. Since B139 Code changes in response to problems identified in the field, the most current B139 Code requirements should be considered when inspecting older installations and when contemplating repairs or upgrades to existing systems. Underground home-heating oil tanks are no longer accepted for new installations.

Who to Contact

24-Hour Yukon Spill Line: 867-667-7244 (collect calls accepted)

24-Hour B.C. Spill Line: 1-800-663-3456

**Government of Yukon
Environment Programs Branch**

Box 2703
Whitehorse, Yukon Y1A 2C6
Phone: 867-667-5683
Fax: 867-393-6205
envprot@gov.yk.ca

Yukon Housing Corporation

410D Jarvis Street
Whitehorse, Yukon Y1A 2C6
Phone: 867-667-5759
Toll Free: 1-800-661-0408 ext. 5759
Fax: 867-393-6441
ykhouse@gov.yk.ca
housing@gov.yk.ca

**City of Whitehorse
Planning & Development Services**

4210 4th Ave.
Whitehorse, YT
Phone: 867-668-8340
Fax: 867-668-8395

**Government of Yukon
Building and Safety Standards Branch**

2071 Second Avenue
Whitehorse, YT
Phone: 867-667-5741
Fax: 867-393-6249

Government of Yukon - Fire Marshal's Office

91790 Alaska Highway
Whitehorse, YT Y1A 5X7
Phone: 867-667-5230
Fax: 867-667-3165

Yukon Region

Aboriginal Affairs and Northern
Development Canada,
Environment Directorate
Phone: 867-667-3888
Fax: 867-667-3801

